Time series analysis of US Treasury

My thoughts on this case study are mixed. In my mind I knew that production source code and scripts were very long and complicated. I still feel this way, but now after learning more about R over the past couple of months it doesn’t seem too bad. If you break it down and take it line by line then it is pretty easy to understand. I am sure that is partially due to understanding R language more and the understanding the concept of coding and manipulating a time series more. It is pretty interesting to see that pretty much everything we have learned in the book is actually utilized in forecasting in the real world

Notes on nonseasonal ARIMA models

Nau boils down construction of non-seasonal ARIMA model into 5 steps:

1. Determine if the original time series need to be transformed in any way appear general symmetric and consistent
2. If new time series is still non-stationary then apply first differencing
3. If the model is still non-stationary after the first differencing, take a second difference
4. This new graph denotes a stationary time series
5. Create forecasts of the stationary data

Nau continues on to describe the process of modeling with ARIMA from a theoretical standpoint without the help of auto.arima() function. He explains how to properly use the ACF and PACF to their advantage. For example Nau says that if there is a spike at a low order lag on the ACF then increase q by 1 and refit and if there is a low-order lag on the PACF increase p by 1 and refit. Something I found to be helpful were the common non-seasonal ARIMA models

* ARIMA(0,0,0)+c = mean (constant) model
* ARIMA(0,1,0) = random walk model
* ARIMA(0,1,0)+c = random-walk-with-drift model (geometric RW if log transform was used)
* ARIMA(1,0,0)+c = regression of Y on Y\_LAG1 (1st -order autoregressive model)
* ARIMA(2,0,0)+c = regression of Y on Y\_LAG1 and Y\_LAG2 (2nd -order autoregressive model)
* ARIMA(1,1,0)+c = regression of Y\_DIFF1 on Y\_DIFF1\_LAG1 (1st -order AR model applied to first difference of Y)
* ARIMA(2,1,0)+c = regression of Y\_DIFF1 on Y\_DIFF1\_LAG1 & Y\_DIFF1\_LAG2 (2nd -order AR model applied to 1st difference of Y)
* ARIMA(0,1,1) = simple exponential smoothing model
* ARIMA(0,1,1)+c = simple exponential smoothing + constant linear trend
* ARIMA(1,1,2) = linear exponential smoothing with damped trend (leveling off)
* ARIMA(0,2,2) = generalized linear exponential smoothing (including Holt’s model)

Analytics Vidhya Tutorial

I found that this tutorial was very helpful. Even though it covered the same information as the book, it is not as clouded with a bunch of confusing equations. It is high level overview, but low enough to get the information across